Naval Research Laboratory
Environmental Quality Sciences

Environmental Quality Sciences
Chemistry Division
U.S. Naval Research Laboratory

The Formation and Fate of Methane Hydrates

Over the past decade methane hydrates have been found throughout the world in coastal ocean sediments. The formation of hydrates is a function of pressure and temperature in the ocean. As a result, the high concentrations of methane in hydrates stimulate exciting questions in basic oceanographic research and searches for future energy sources. It is thought that concentrations of the hydrates are two orders of magnitude greater than the current estimates of petroleum. Efficient hydrate mining methods are currently being investigated in Japan, India and the United States. Methane hydrates has potential to provide a clean and abundant future energy source.

The presence high concentrations of methane also stimulate questions on global warming. In many coastal regions around the world a small rise in ocean temperature would result in the release of high methane concentrations. A key research question that is being addressed by scientists at NRL is the contribution of this energy source to the ocean carbon cycle. In addition, research will compare biological assimilation of this energy source relative to atmospheric transport.

This research program was initiated at NRL this summer. NRL Scientists participated on research cruises in the Gulf of Mexico and the Norwegian-Greenland Sea. Samples taken during submarine dives in these regions will be examined with stable and radio carbon isotope analysis of bacteria and organic and inorganic carbon pools to understand the range of microbial roles in the formation and stability of methane hydrates.

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